

# CDAW2010

## Grad-Shafranov Reconstruction Results

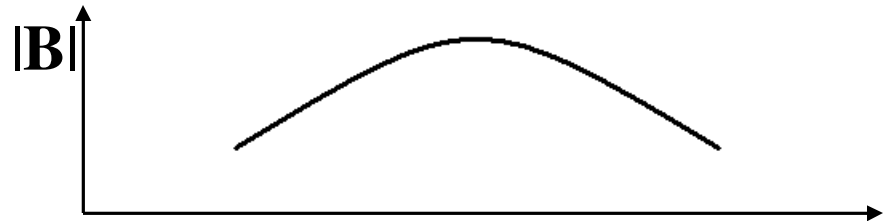
Qiang Hu

Qh0001@uah.edu

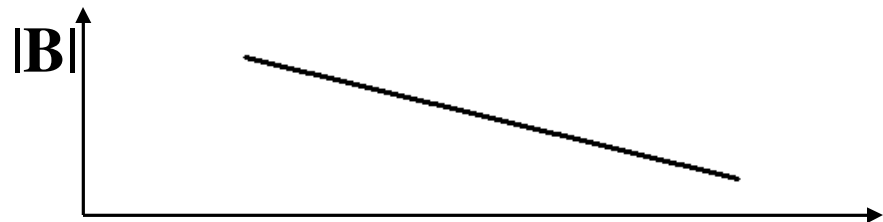
# Typical MCs Classification

(based on the magnetic field magnitude profile)

1. Center-peaked

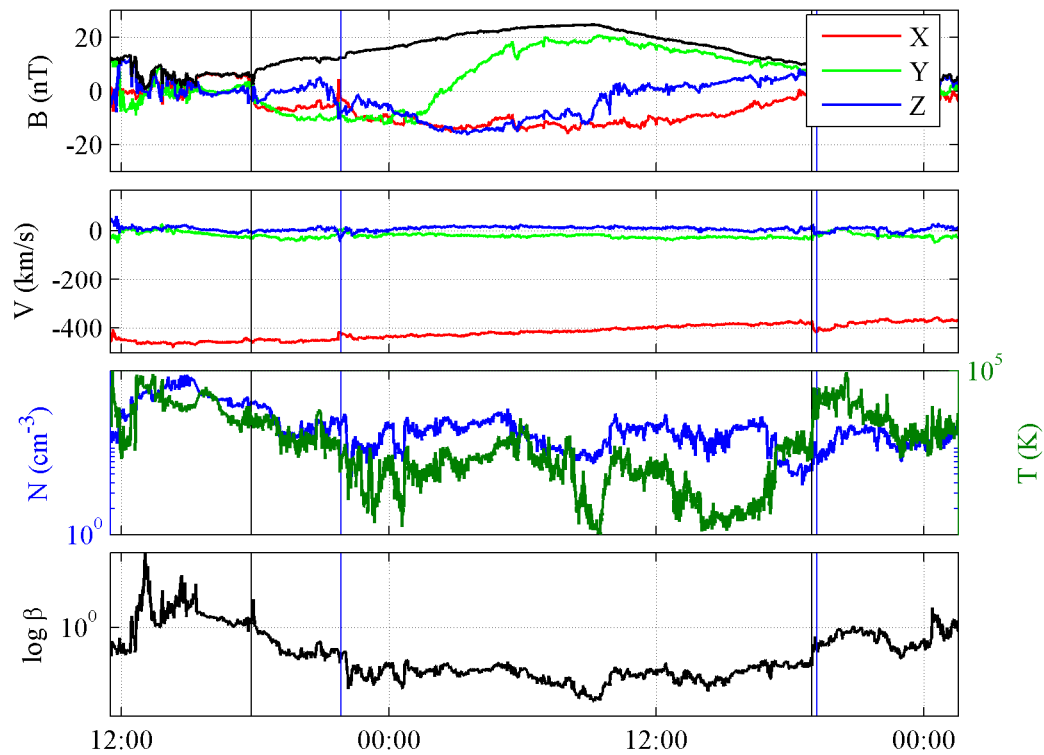


2. Down-sloped



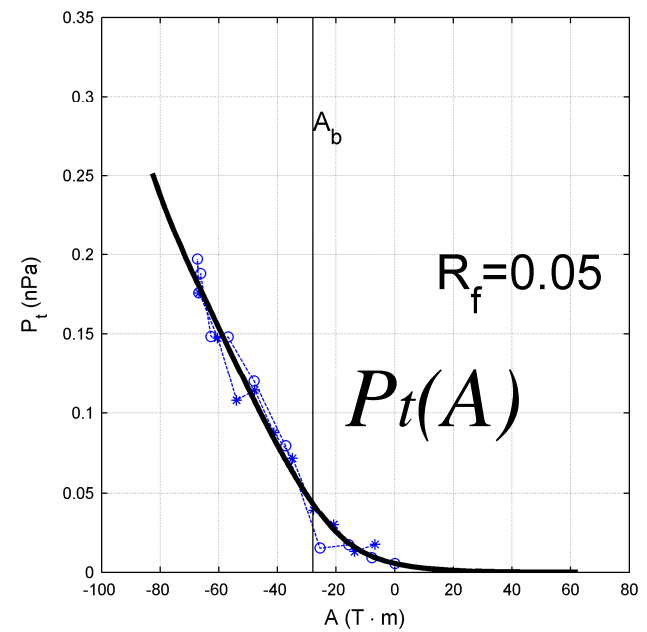
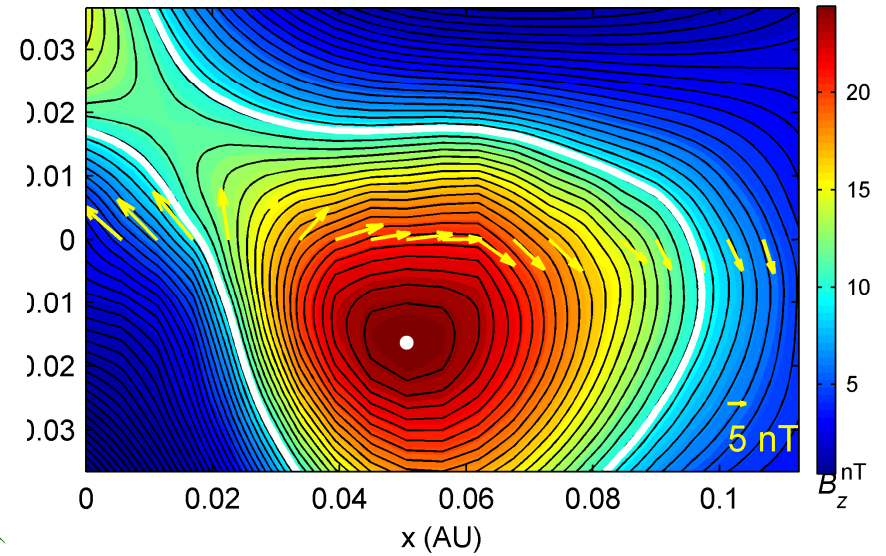
3. Irregular (everything else)

1. #9

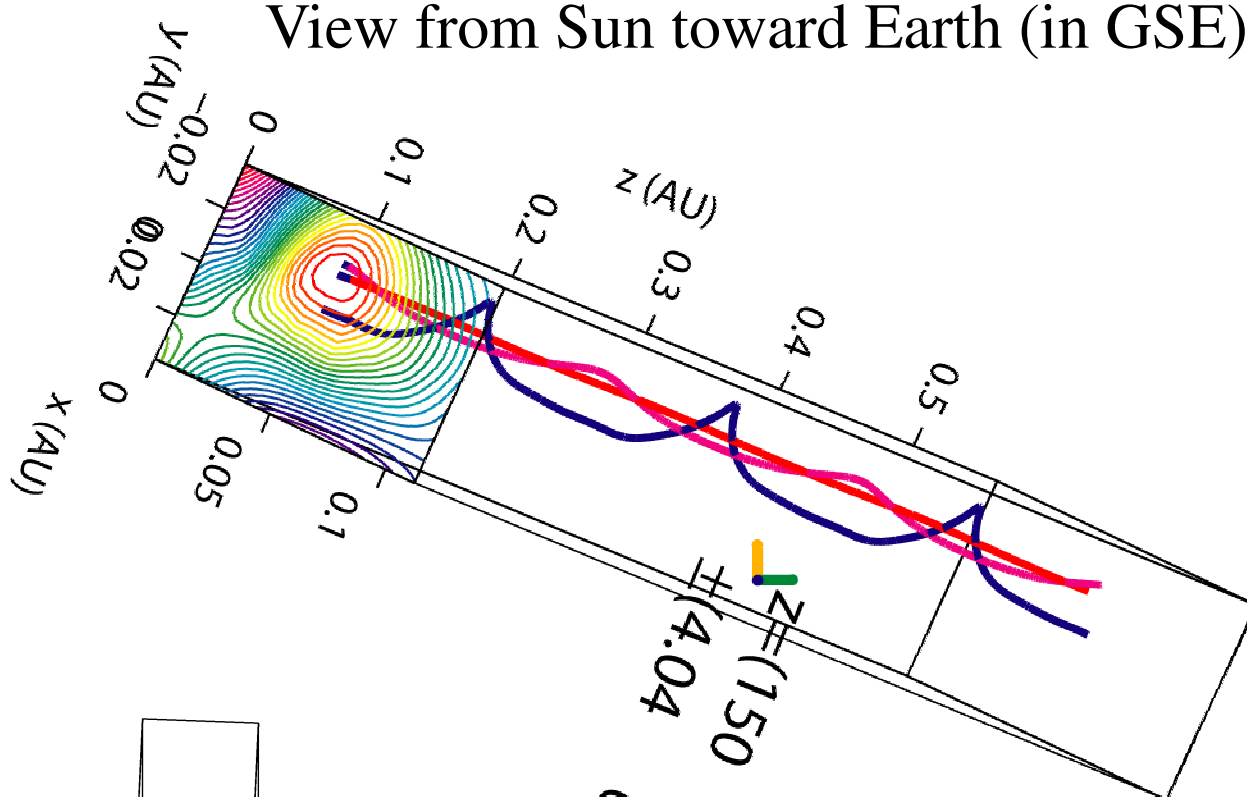
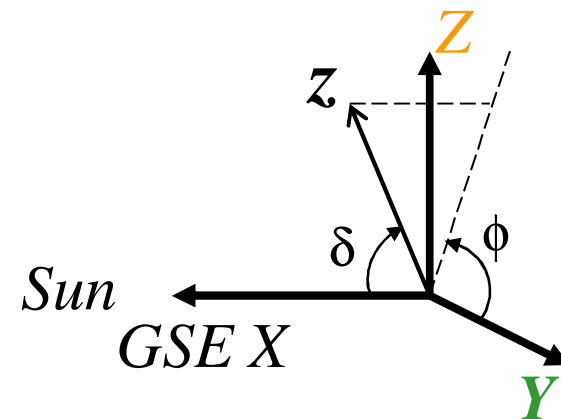


16-Apr-1999 17:50:19 - 17-Apr-1999 18:58:34  
 16-Apr-1999 21:51:23 - 17-Apr-1999 19:11:22  
 16-Apr-1999 21:51:23 - 17-Apr-1999 19:11:22  
 16-Apr-1999 21:51:23 - 17-Apr-1999 19:11:22

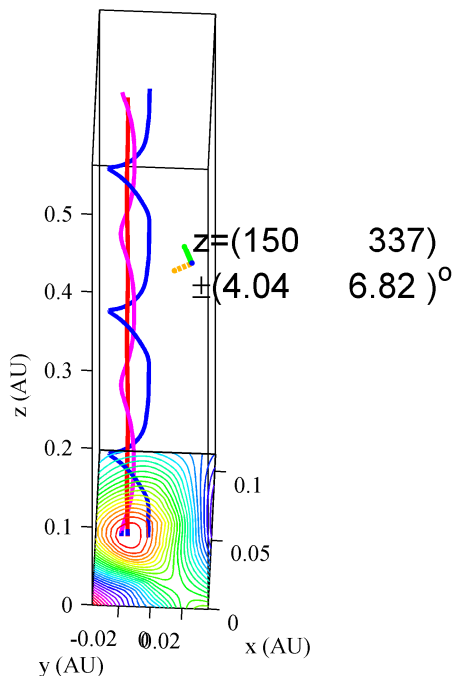
Cross-section:



View from Sun toward Earth (in GSE):

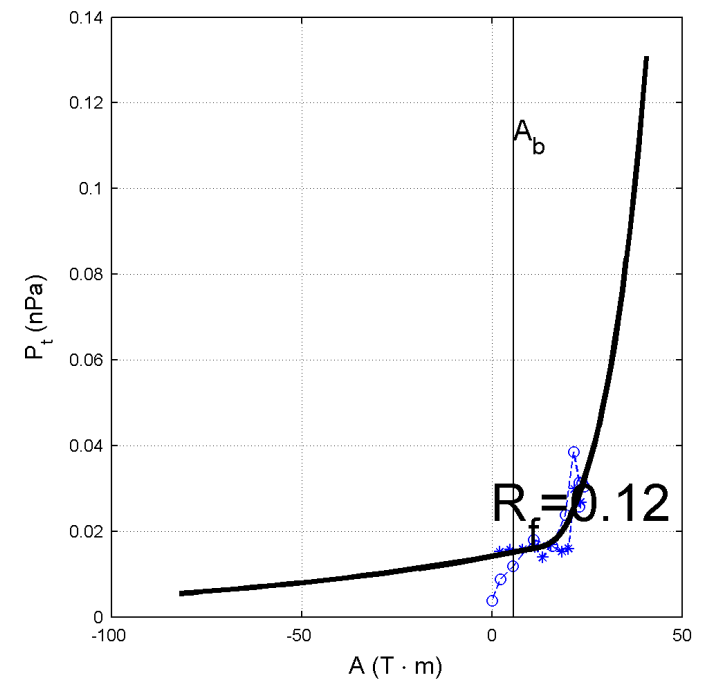
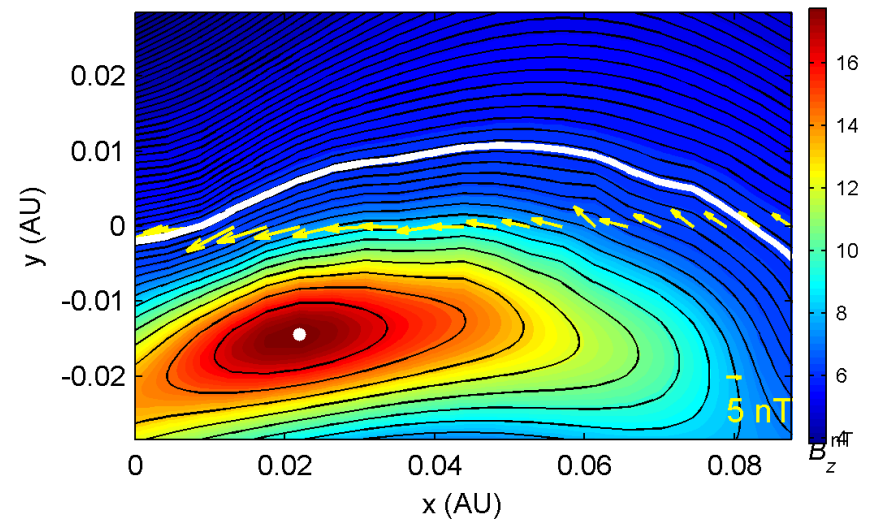
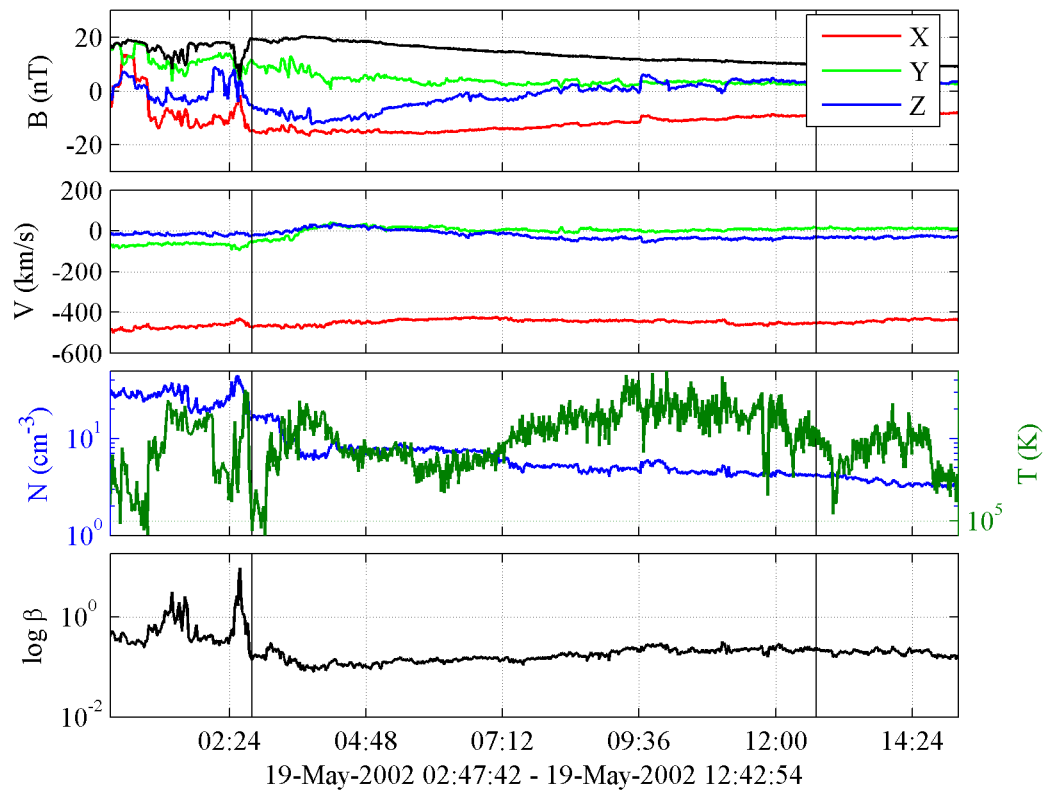


$$\begin{aligned} \langle \beta \rangle &= 0.0337 \\ Y_0 &= -0.0163 \text{ AU} \\ B_{z\max} &= 25.2 \text{ nT} \\ J_{z\max} &= -5.34e-012 \\ \Phi_z &= 1.54e+012 \text{ Wb} \\ \Phi_p &= 8.16e+012 \text{ Wb} \\ \Sigma J_z &= 3.38e+008 \end{aligned}$$

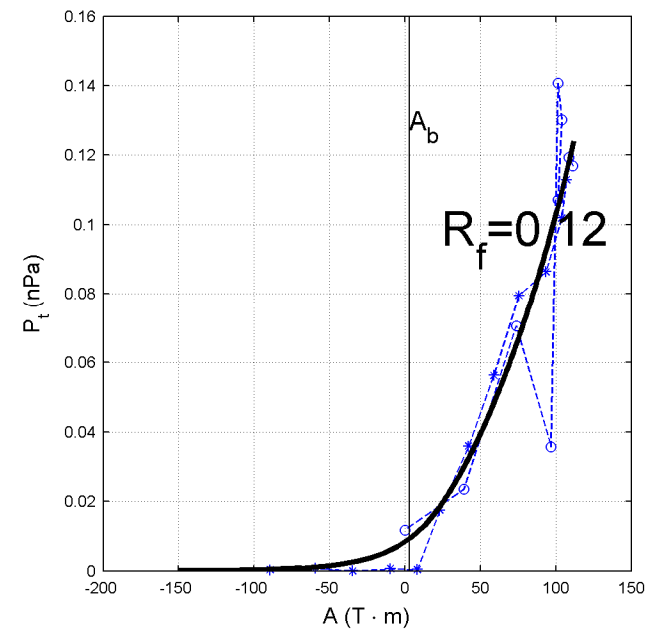
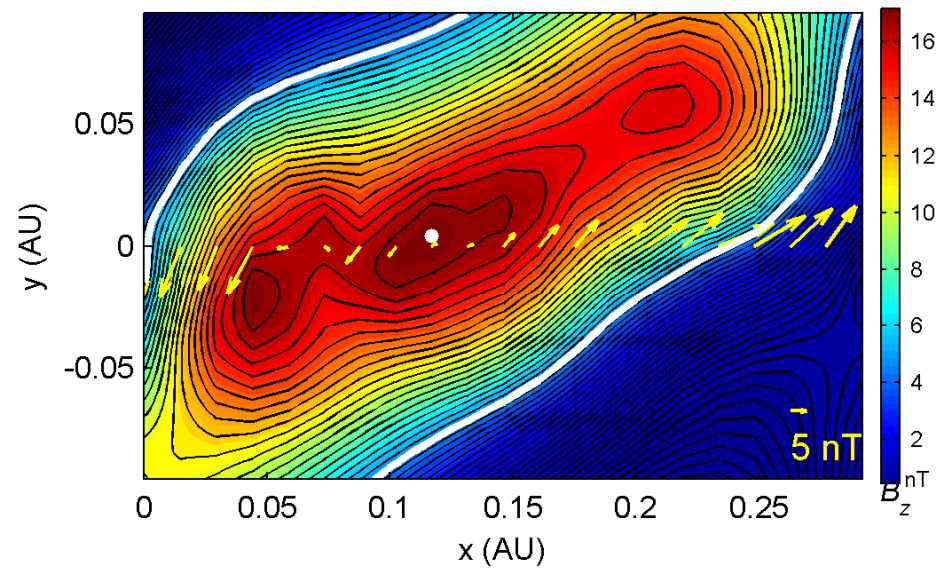
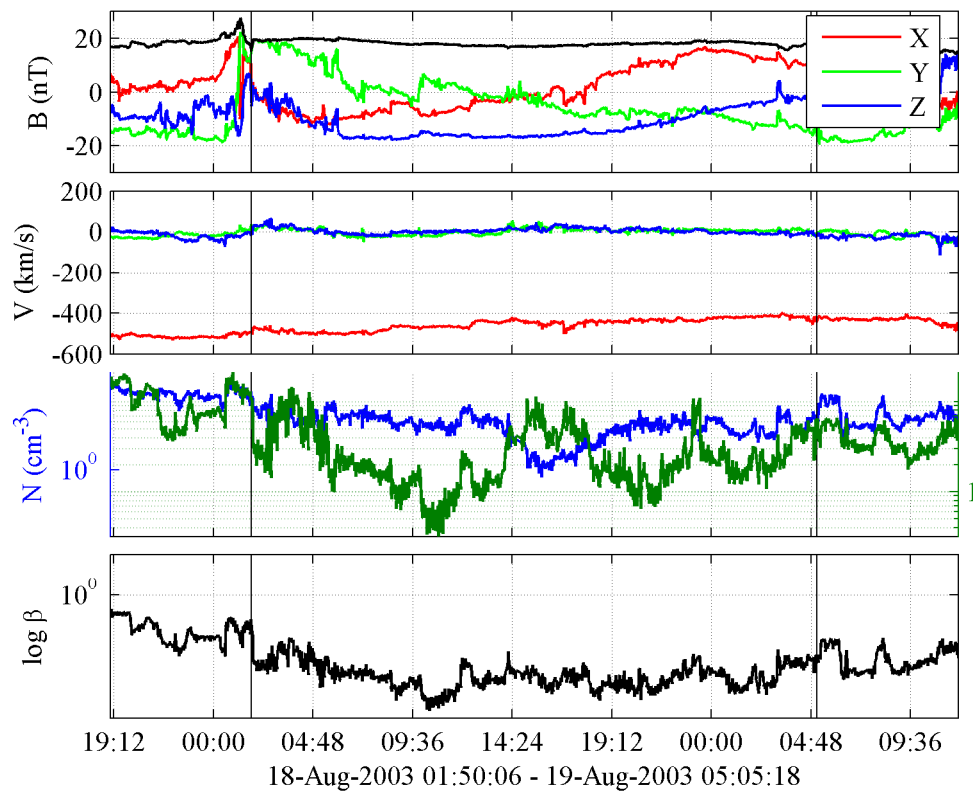


Relative helicity per AU:  
 $Kr = -9.1e+024 \text{ Wb}^2$

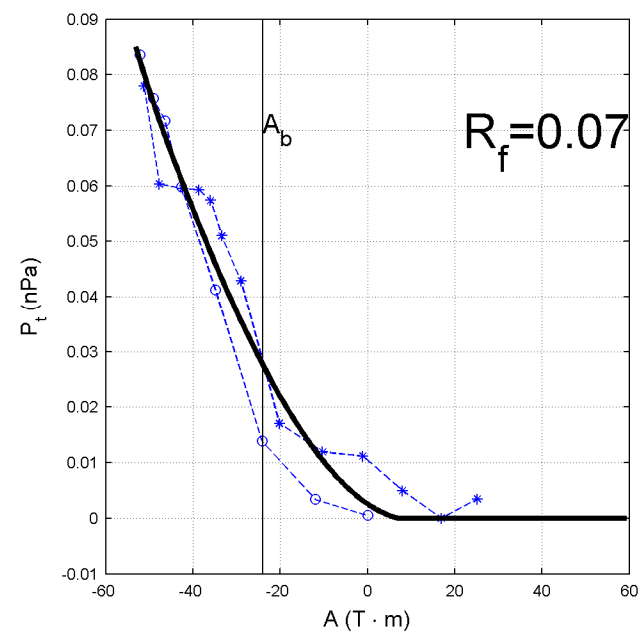
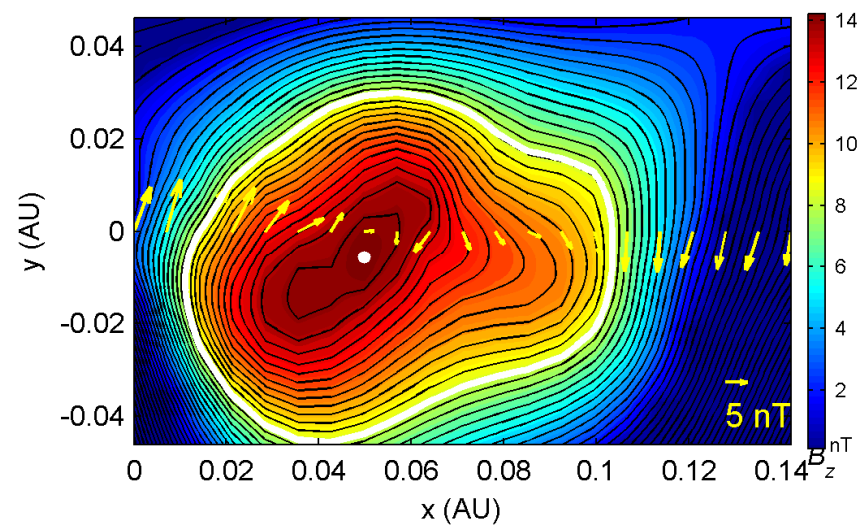
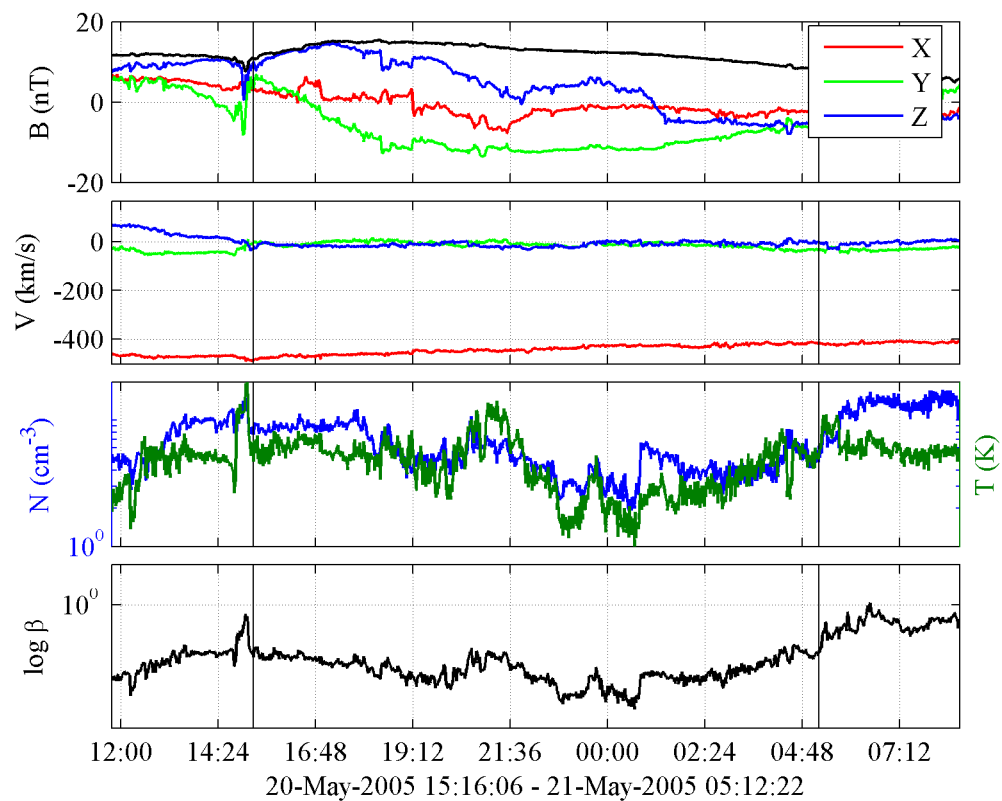
## 2. #39



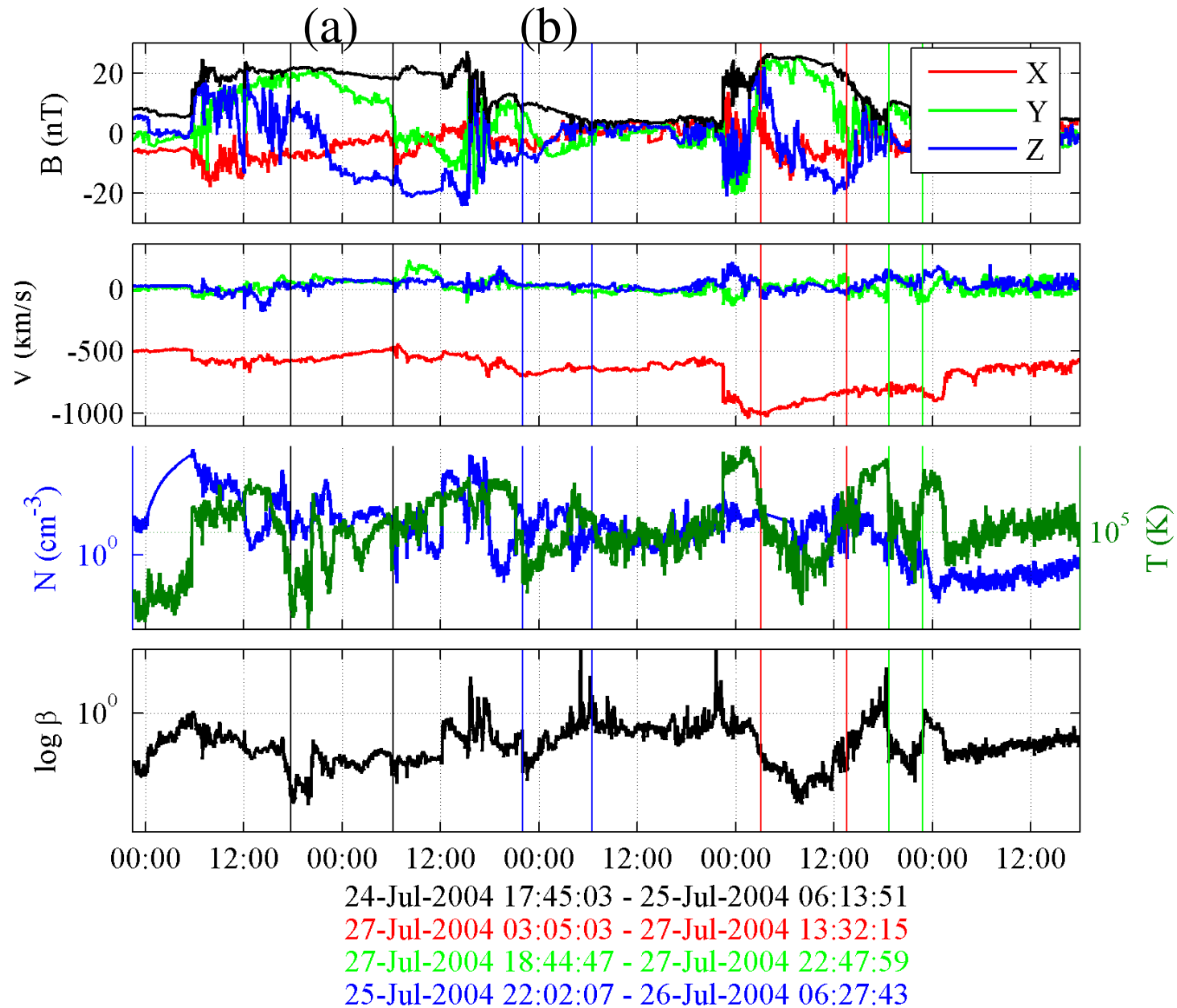
### 3. #44



#54



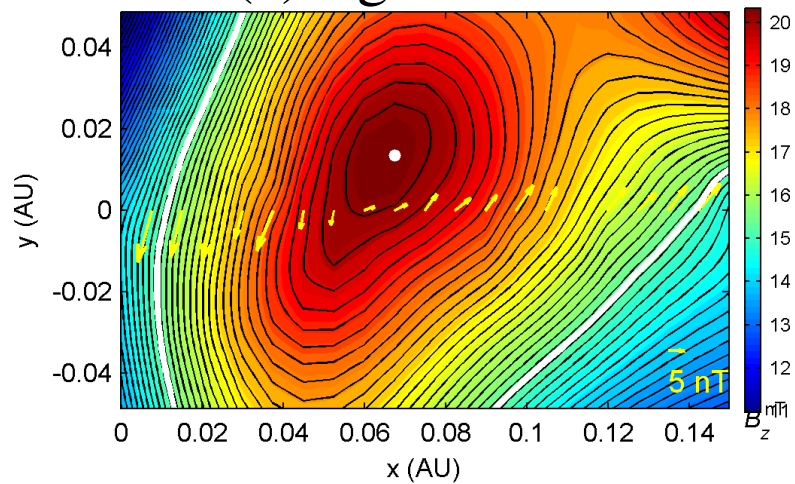
A series of events...



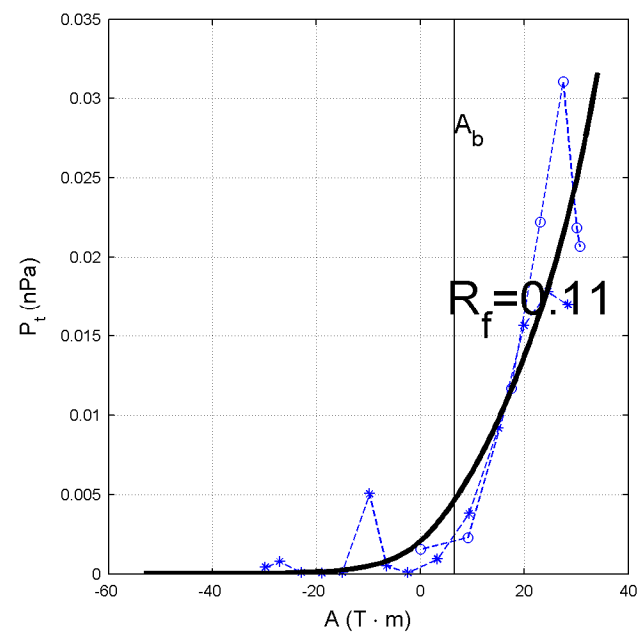
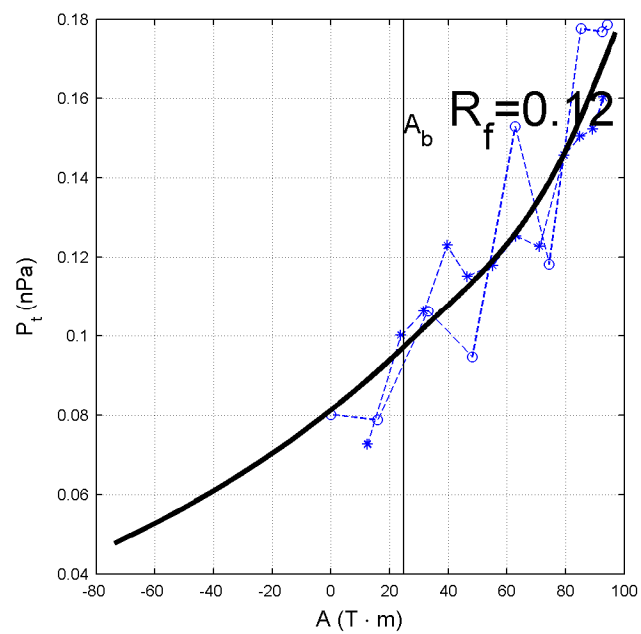
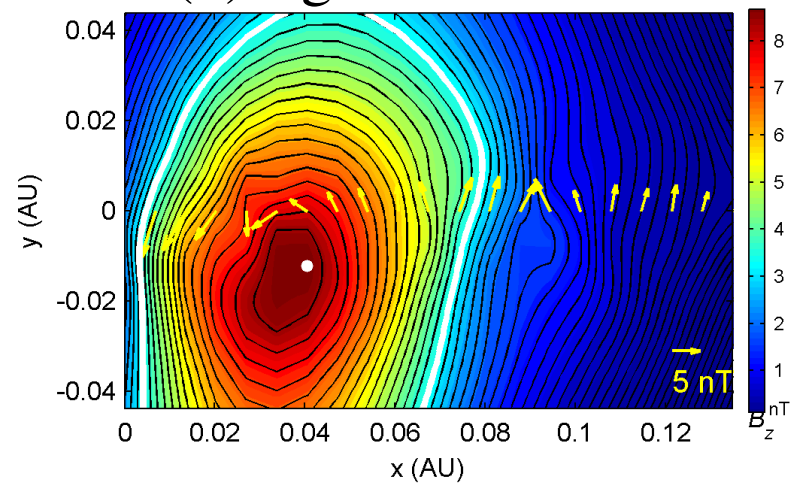


#48

(a) right-handed

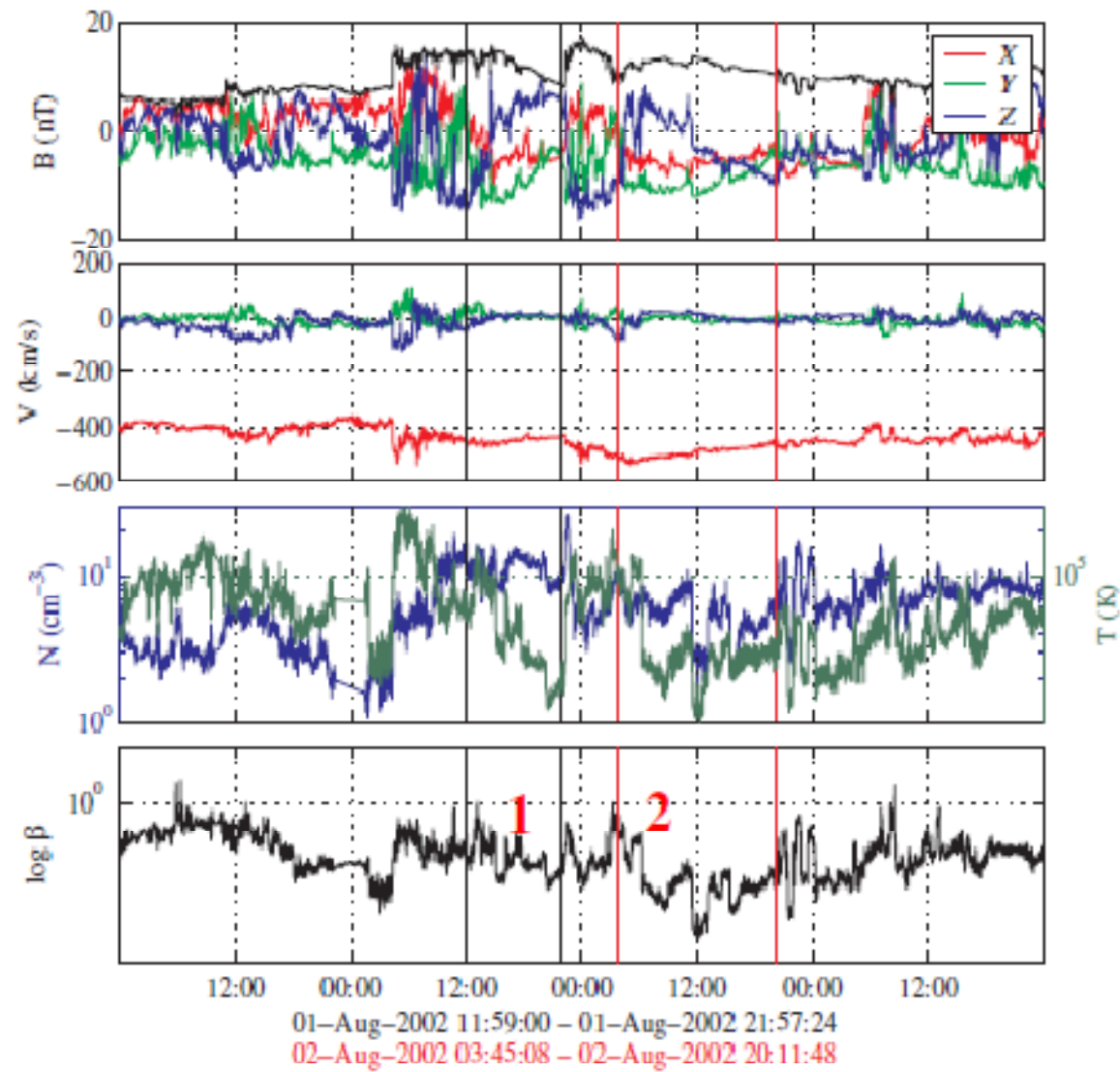


(b) right-handed

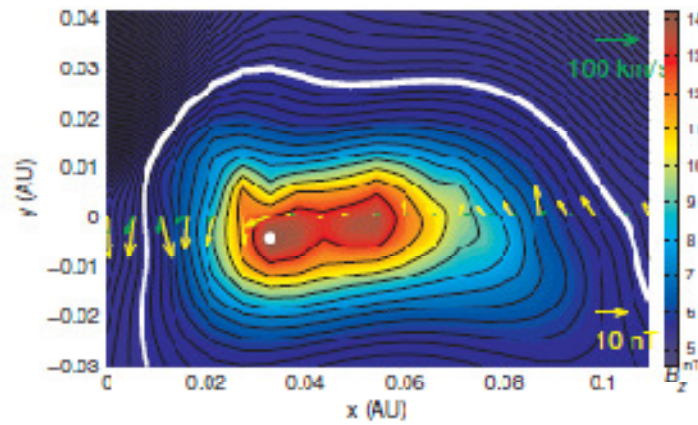


#43

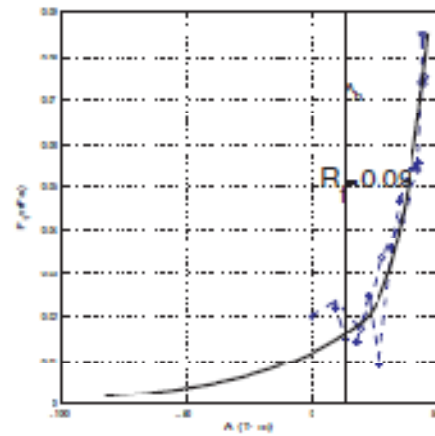
• August 1<sup>st</sup> and 2<sup>nd</sup> 2002 event



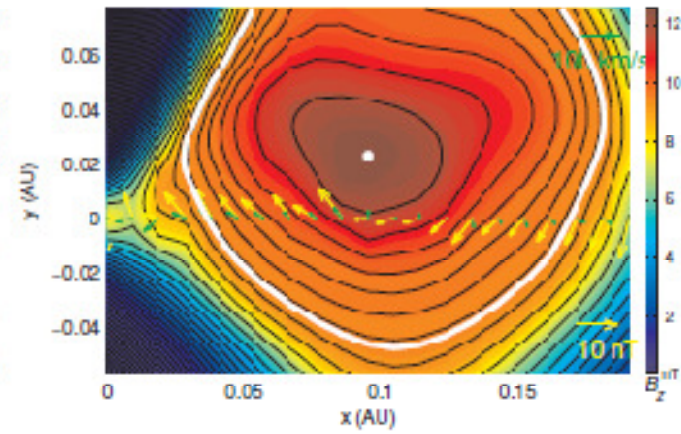
1: Right-handed



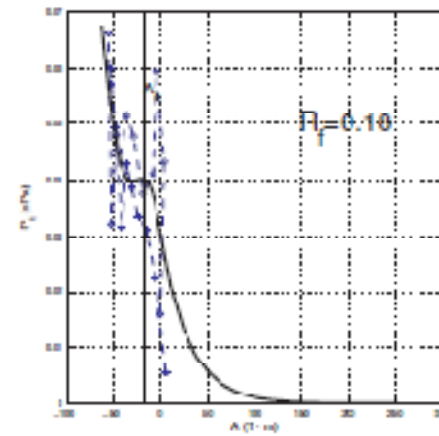
$$z_1 = (105, 168) \pm (4, 4)^\circ$$



2: Left-handed

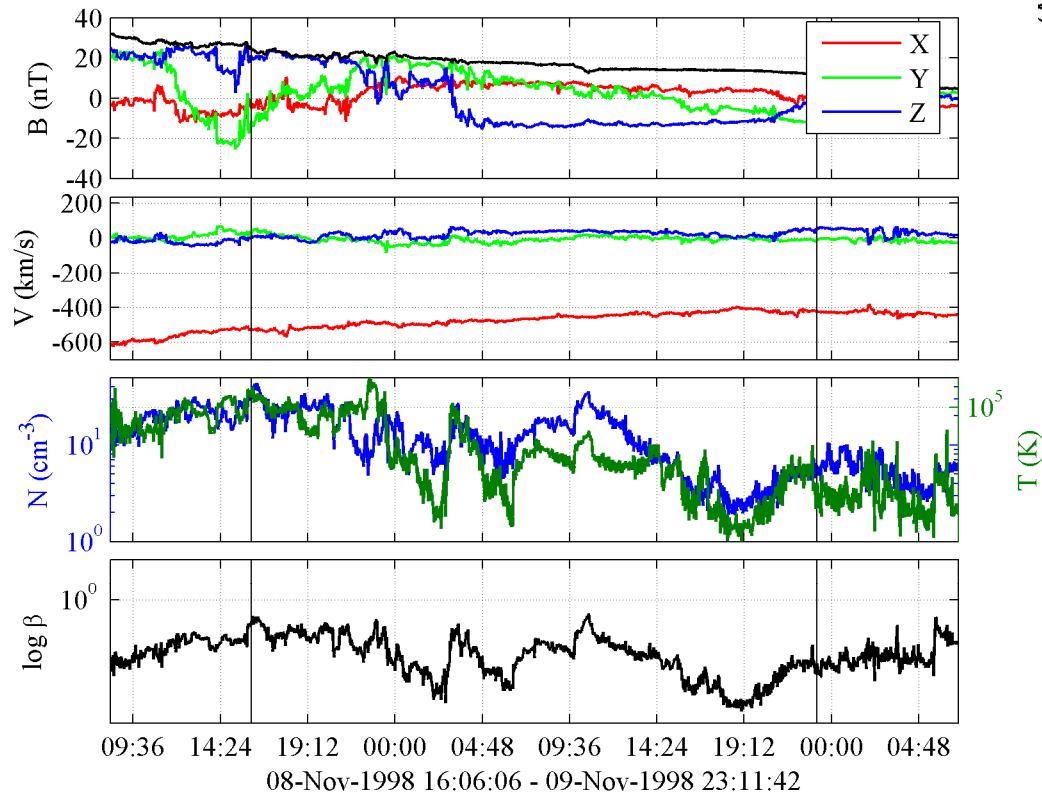


$$z_2 = (97, 193) \pm (1, 1)^\circ$$

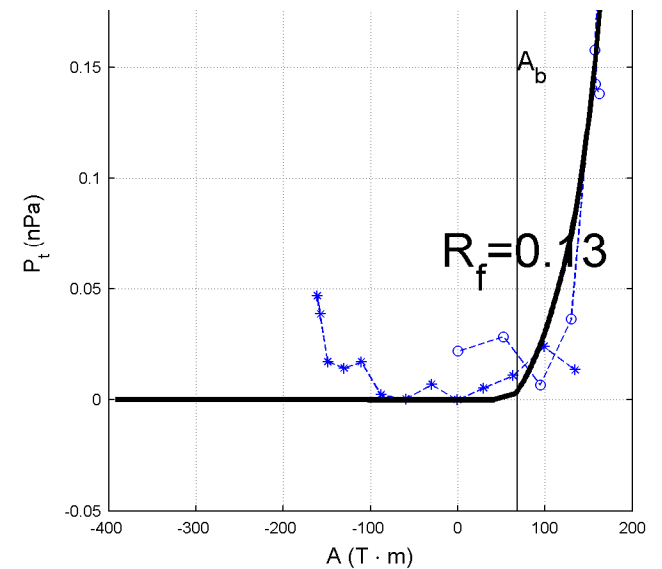
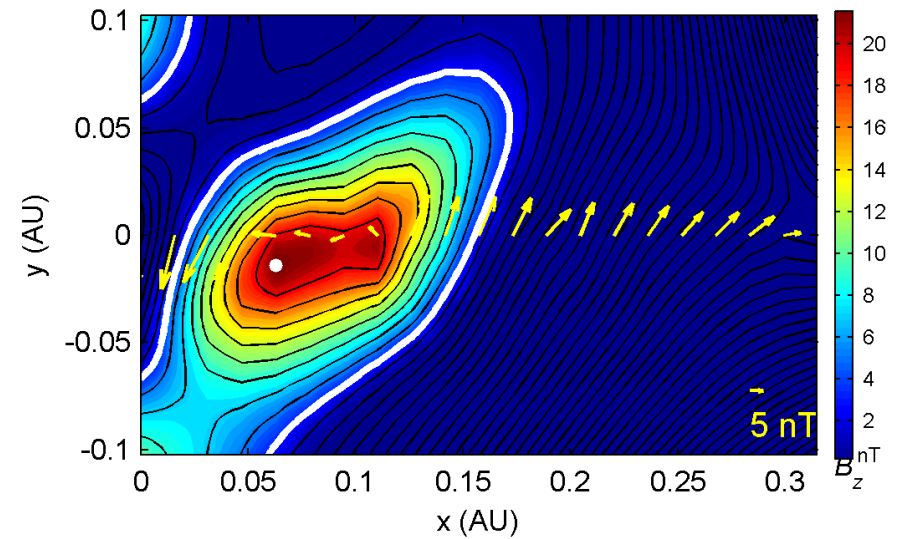


# Ejecta (flux rope embedded)

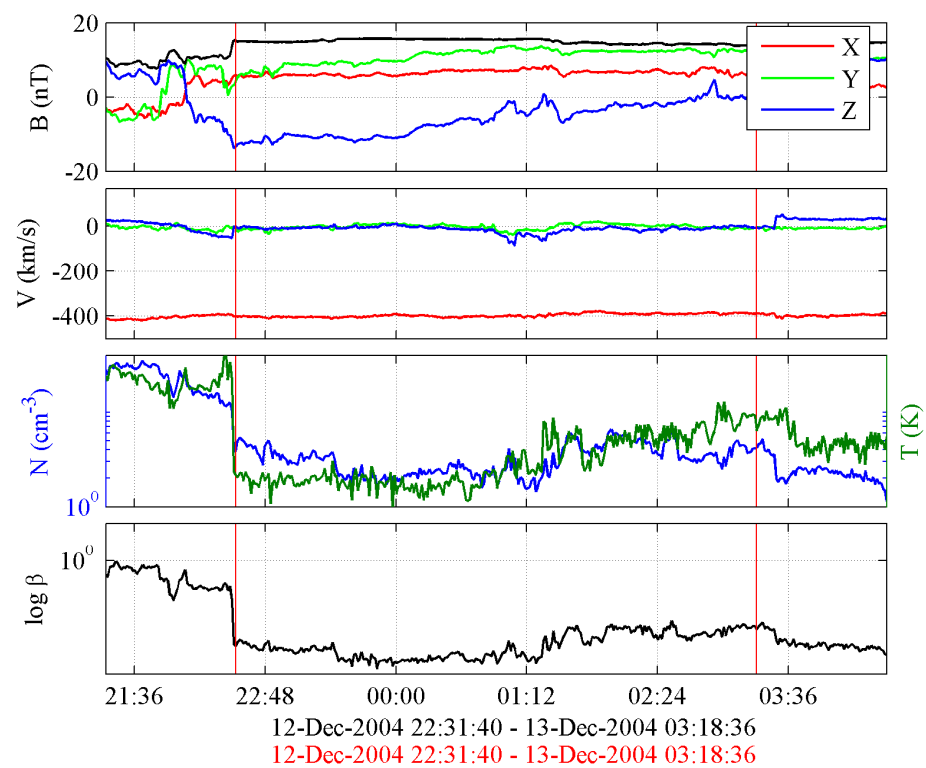
#7



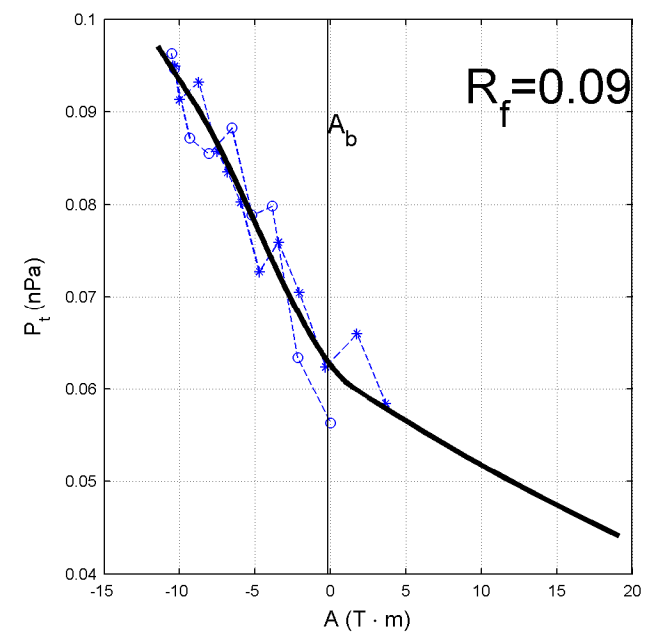
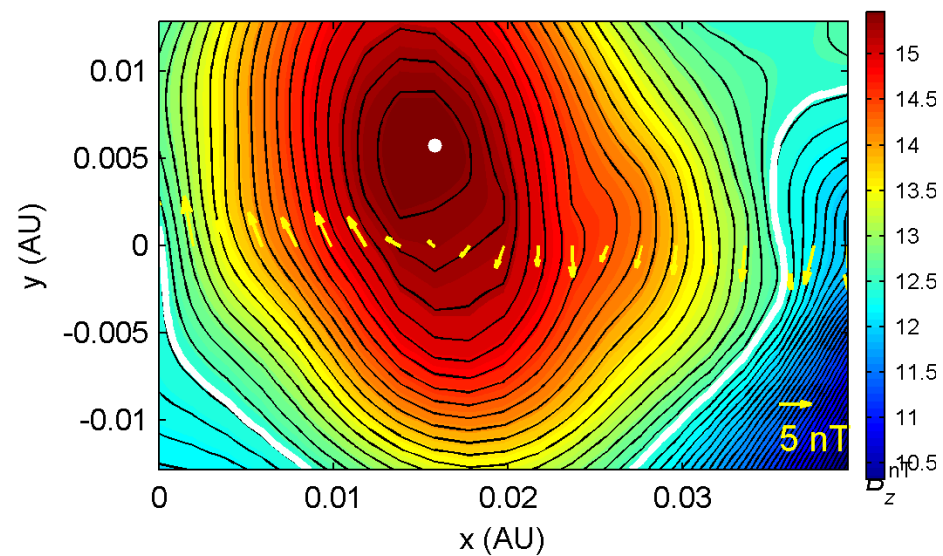
~ 30 hour interval



#50



~ 5 hour interval



More analysis results available upon  
request.

Source code (in Matlab) freely available  
upon request.